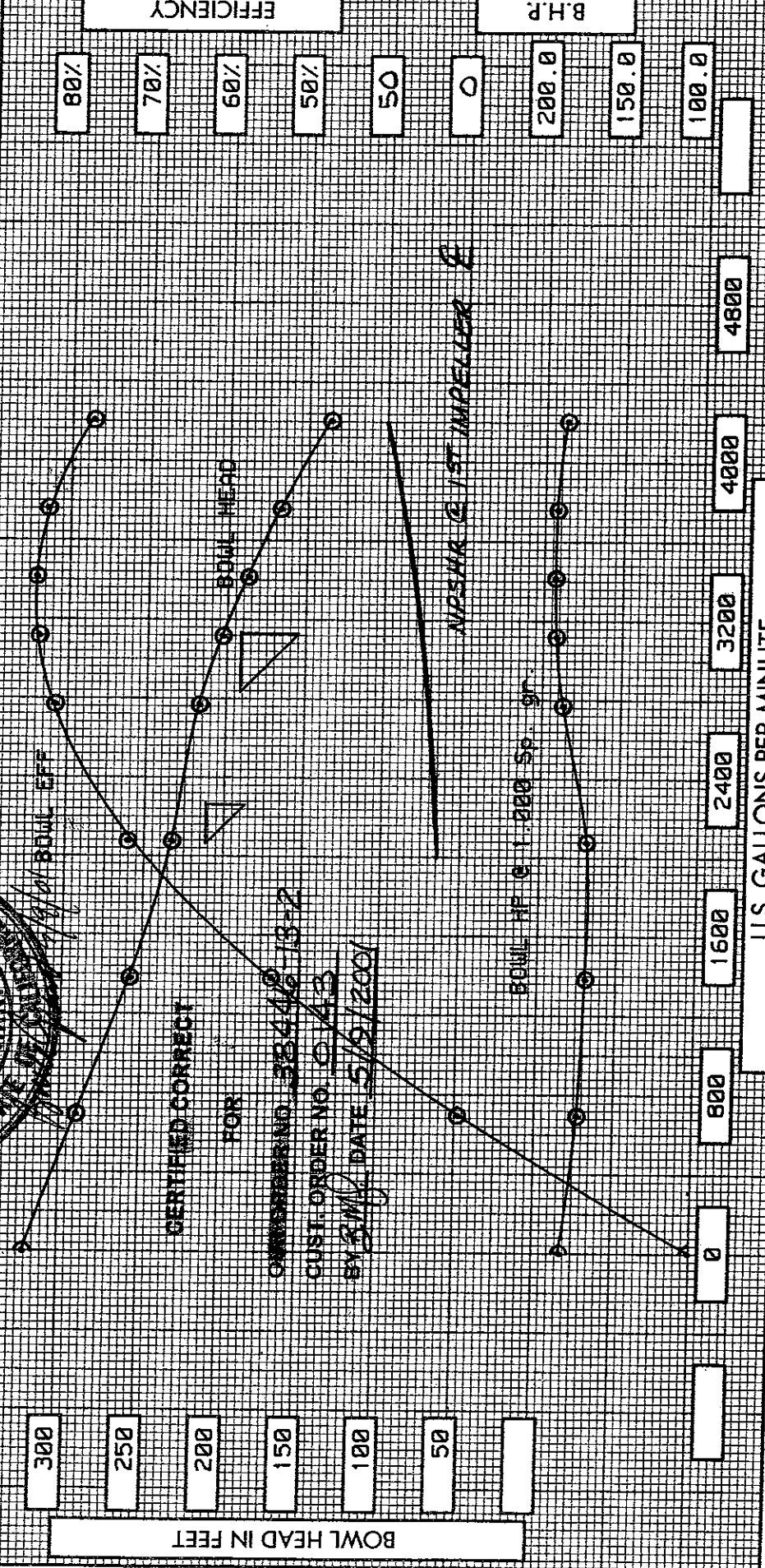


IOWA CITY WATER FACILITY IMPROV.
 WATER TREATMENT PLANT #2 IOWA IA
 280 HP COLLECTOR WATER PUMP
 COLLECTOR WELL-4 PUMP NO. # P-2
 PUMP TEST: PC # 27131



CERTIFIED CORRECT
 FOR
 DRAWING NO. 38446-13-2
 CUST. ORDER NO. 0143
 BY B.M.G. DATE 5/5/2001

TYPE 16 DKL
 NO. OF STAGES 2
 R.P.M. 1780
 PUMP SERIAL NO. 38446-13-2

DWN. BY E. M. S. DATE 05/09/2001



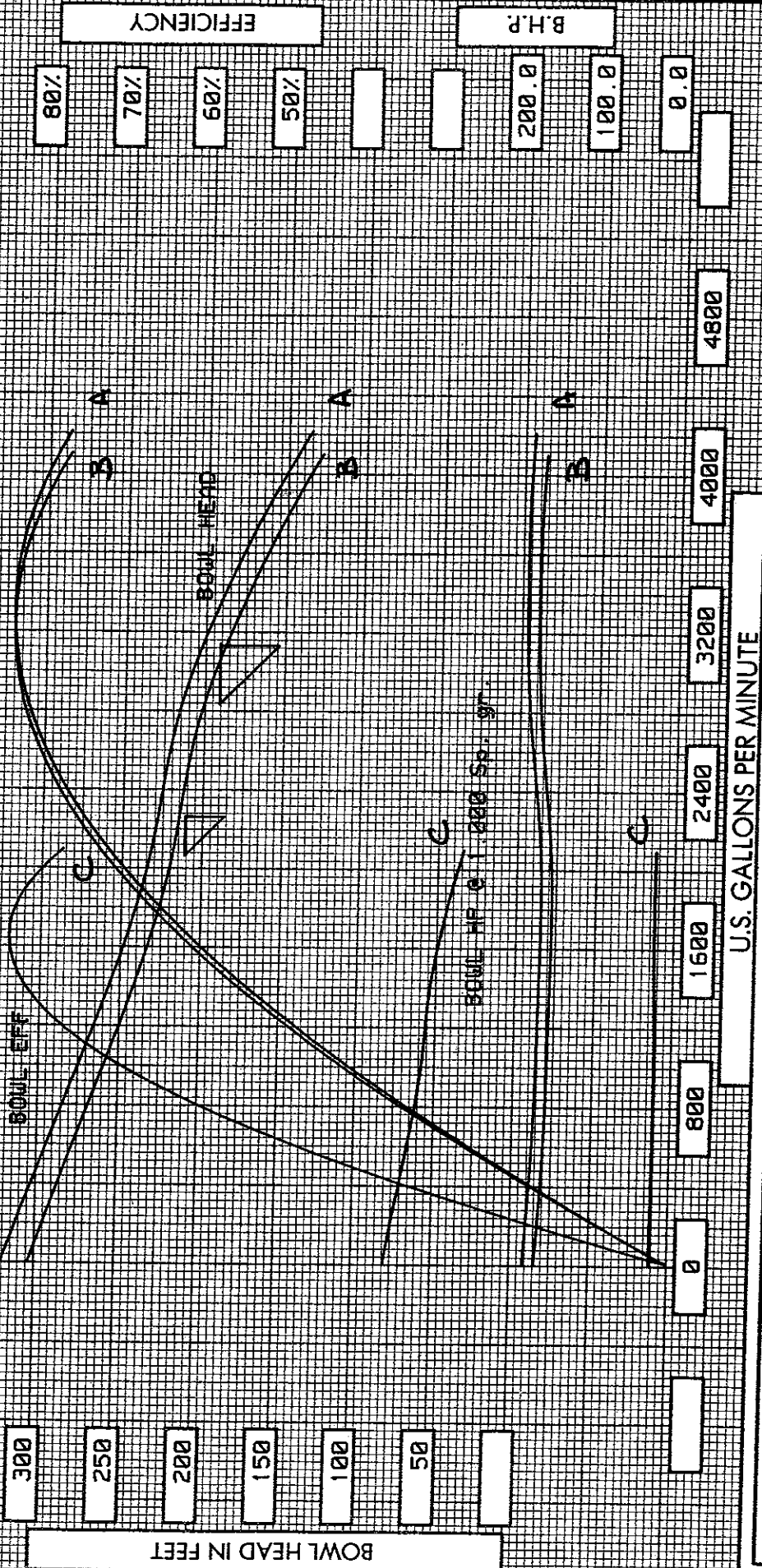
A **WESCO** COMPANY

KNUTSON CONSTRUCTION
 2351 SOUTH SCOTT BLVD.
 IOWA CITY IA 52244

DWG. NO. 38446-13-2-T1

CURVE LINE A = 1750 RPM
 CURVE LINE B = 1732 RPM
 CURVE LINE C = 665 RPM

IOWA CITY WATER FACILITY IMPROV.
 WATER TREATMENT PLANT #2 IOWA IA
 200 HP COLLECTOR WATER PUMP
 COLLECTOR WELL-4 PUMP NO. # P-2
 PUMP TEST: PC # 27131



TYPE 16 DKL
 NO. OF STAGES 2
 R.P.M. 1750
 PUMP SERIAL NO. 38446-13-2

DWN. BY B. M. S. DATE 05/16/2001



FRESNO, CALIFORNIA

A **UNIT** COMPANY

KNUTSON CONSTRUCTION
 2351 SOUTH SCOTT BLVD.
 IOWA CITY IA 52244

DWG. NO. 38446-13-2-T1 (UFD)

TEST NUMBER PC#: 27131 S.O. # : 38446-13-2 DATE: 05/09/2001

CONDITION POINT: GPM= 3130 TDH= 190 RPM =1780

CALCULATED BY: B.M.S. DRAWING No. = 38446-13-2-T1

PUMP TYPE (Bb\$): 16 DKL
 METER CONSTANT (Mc) = 0.9957 IMPELLER TRIM DIA. = 10.080 inch
 GAGE HEIGHT (Ght) = 5.170 IMPELLER FINAL DIA. = 10.080 inch
 NUMBER OF STAGES (Stages) = 2 NUMBER OF STAGES TESTED (Ds) = 2
 SPECIFIC GRAVITY (SPG) = 1.0000
 WATER TEMPERATURE = 65 DEGREES (F) SPECIFIC WEIGHT = 62.324 Lbs/Cu Ft.
 COLUMN SIZE = 12
 MOTOR NUMBER (Mno) = 10

RUN	RPM	GPM	PRESS	GA COR	S LOSS	C-LOS	DH-LOS	VEL HD	HP RDG.	B LOS
1	1789	0.0	137.70	0.00	0.00	0.00	0.00	0.00	193.00	0.00
2	1790	700.0	123.80	0.00	0.00	0.00	0.00	0.06	183.00	0.00
3	1790	1400.0	109.70	-0.01	0.00	0.00	0.00	0.24	179.10	0.00
4	1790	2100.0	98.80	-0.17	0.00	0.00	0.00	0.53	180.10	0.00
5	1789	2800.0	91.80	-0.32	0.00	0.00	0.00	0.94	197.60	0.00
6	1788	3150.0	85.60	-0.45	0.00	0.00	0.00	1.20	202.40	0.00
7	1788	3450.0	78.30	-0.07	0.00	0.00	0.00	1.43	203.40	0.00
8	1789	3800.0	69.50	-0.10	0.00	0.00	0.00	1.74	203.20	0.00
9	1789	4250.0	55.50	-0.06	0.00	0.00	0.00	2.18	197.20	0.00

I	RPM	GPM	TDH	TDH/STAGE	BHP	BHP/STAGE	EFF	MTR EFF
1	1780	0.0	320.08	160.04	181.31	90.66	0.00	0.9538
2	1780	693.1	288.02	144.01	171.60	85.80	29.38	0.9536
3	1780	1386.2	255.96	127.98	167.93	83.96	53.36	0.9535
	1780	2079.3	230.98	115.49	168.87	84.44	71.82	0.9535
	1780	2773.9	215.30	107.65	185.65	92.83	81.23	0.9539
6	1780	3122.4	201.29	100.65	190.50	95.25	83.32	0.9540
7	1780	3419.8	185.68	92.84	191.44	95.72	83.76	0.9540
8	1780	3764.6	165.58	82.79	190.94	95.47	82.44	0.9540
9	1780	4210.4	134.08	67.04	185.28	92.64	76.95	0.9539



Bruce Grant 5/9/01

5/12/01 @ 10:30

DATE 5-7-01 TEST NO. PC-27131 CUSTOMER Knutson Construction Svcs S/N # 38446-13-a REPORT
 PUMP DESCRIPTION 16 DKL NO. OF STAGES 2 STG. COL. SIZE & LENGTH 12" x 10" / 16 SHAF SIZE 1 1/2
 HEAD SIZE & TYPE 12x20 1/2" BOW (GLD) IMPELLER (SERIAL) # 3 Polish IMPELLER DIA. 10.080 U.F. STD. 1 1/2
 MOTOR DATA: MAKE Lab SERIAL NO. # 10 H.P. 250 POLES 4 PHASE 3 CYCLE 60 VOLTS 460 TYPE V.V.S.
 MOTOR EFF. (PUBLISHED) (GUARANTEED) ~ % FULL LOAD AMPS 114 METER CONSTANT Kh = 138.93 (50HP-230V) 1158.18 (100HP-460V)
 METER SIZE & TYPE 12x16 GAGE DESCRIPTION 300/100 # Kh= 2779.6246 (400H-460V) 6949.0616 (1000HP-2300V)
 12160.875 (2500HP-4160V)

MANIFOLD ADAPTER: SIZE 12x14 OFFSET STRAIGHT AXIAL ADJUSTMENT 0 1/2 (turns) inches 10 TPI

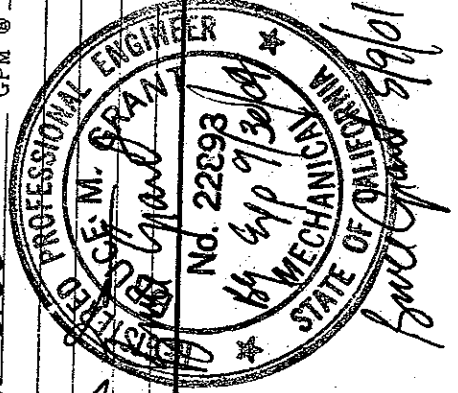
COMMENTS: _____
 REF. NO.: _____
 TIME START: 2:00 FINISH 10:05

TEST RPM	MANOMETER READING IN GPM	TOTAL GPM READING x .9957	GPM @ <u>1785</u> RPM	PRESSURE GAGE	DISCHARGE GAGE READING IN P.S.I.	DISCHARGE GAGE CORRECTION	TOTAL P.S.I.	GAGE HEAD IN FEET	GAGE HEAD IN FEET	SYSTEM LOSSES IN FEET	GAGE ELEV. IN FEET	VELOCITY HEAD IN FEET	TOTAL HEAD IN FEET	HEAD IN FEET	HEAD PER STAGE RPM	SECONDS PER REVOLUTIONS	AVERAGE VOLTS	AVERAGE AMPS	POWER METER INPUT KW <input type="checkbox"/> HP <input type="checkbox"/>	FIELD HP	F HP @ <u>1785</u> RPM	F HP @ <u>1000</u> SPEC GRAVITY	OVERALL EFF	PUMP EFF	
1789	0		300* 197.7 .00																						
1790	700		123.8 .00																						
1790	1400		109.7 .01																						
1790	2100		98.8 .17																						
1789	2900		91.8 .31																						
1788	3150		85.6 .49																						
1788	3450		100* 78.3 .07																						
1789	3800		69.5 .10																						
1789	4250		55.5 .06																						

FORMULAE: GAGE HEAD P.S.I. x 2.3105 INPUT H.P. = NO. OF REV. X Kh TIME AMPS x VOLTS x P.F. 431 FIELD HP = INPUT HP x MTR. EFF. OVERALL EFF = TOTAL HEAD INPUT H.P. x 3660 PUMP EFF = OVERALL EFF. MOTOR EFF. K = JOB RPM TEST RPM

CONDITION POINT: 3130 GPM @ 190 T.D.H. @ 1785 RPM

TESTED BY: _____
 WITNESSED BY: _____
 DATE: 5/7/01 PAGE 1 OF 1
 TEST EQUIPMENT: _____
 DESCRIP: 300 # 100 # Power Meter Air Fax EQUIP NO: 72/1515 72/1800 72/1302 72/2002 CALIB: 4-25-01 4-24-01 2-02-01 Self-cal DUE DATE: 5-25-01 5-24-01 2-02-02 Self-cal





HYDROSTATIC TEST REPORT

Rev. No.: _____

Date Issued: 10-12-00

Order: <u>KNUTSON CONSTRUCTION SVCS</u>	Parent Job: <u>82705</u>
Serial Number: <u>38446-13-2</u>	Customer PO: <u>0143</u>

Applicable Specification: H1 Witness by Customer: N

Project Engineer: RP Application Engineer: LC Ship Date: 6-4-01

	Size	PSIG Req'd	PSIG Tested	Prelim. Test Date	Final Test Date	Tester	Q.C.	Witness	Req'd
Discharge Head:	<u>16x20 'F'</u>	<u>200</u>	<u>200</u>	<u>5-19-01</u>	<u>5-19-01</u>	<u>[Signature]</u>			<input checked="" type="checkbox"/>
Outer Shell:									<input type="checkbox"/>
Inner Shell:									<input type="checkbox"/>
Barrel:									<input type="checkbox"/>
Column, Qty:									<input type="checkbox"/>
Bowl(s) Qty:									<input type="checkbox"/>
Discharge Case:									<input type="checkbox"/>
Booster Lead Assy:									<input type="checkbox"/>
Cooling Loop Assy:									<input type="checkbox"/>
Other:									<input type="checkbox"/>

High Tensil Bolting Required: _____ Duration of test per customer specifications: _____ Hrs. _____ Mins.

NO CASTING WELD REPAIR

Additional Hydrottest Requirements: _____

COMPLETED

FLOWAY PUMPS HYDROSTATIC TEST POLICY: STANDARD TEST: Booster lead assembly - 100 PSIG. Parts under discharge pressure 1-1/2 times shut-off pressure or 200 PSIG whichever is greater. (Note: Total discharge pressure is the sum of the suction pressure and pump differential pressure). Standard test will be 5 minutes in duration. API 610: Duration will be 30 minutes minimum. Fire Pumps: U.L. - 1-1/2 times shut-off pressure or a minimum of 250 PSIG. F.M. - 2 times shut-off or a minimum of 250 PSIG. U.L.C. - 2 times shut-off or a minimum of 350 PSIG.

We certify that the identified tests were completed and are in accordance with the stated specifications and that test instrumentation is in a current state of calibration.

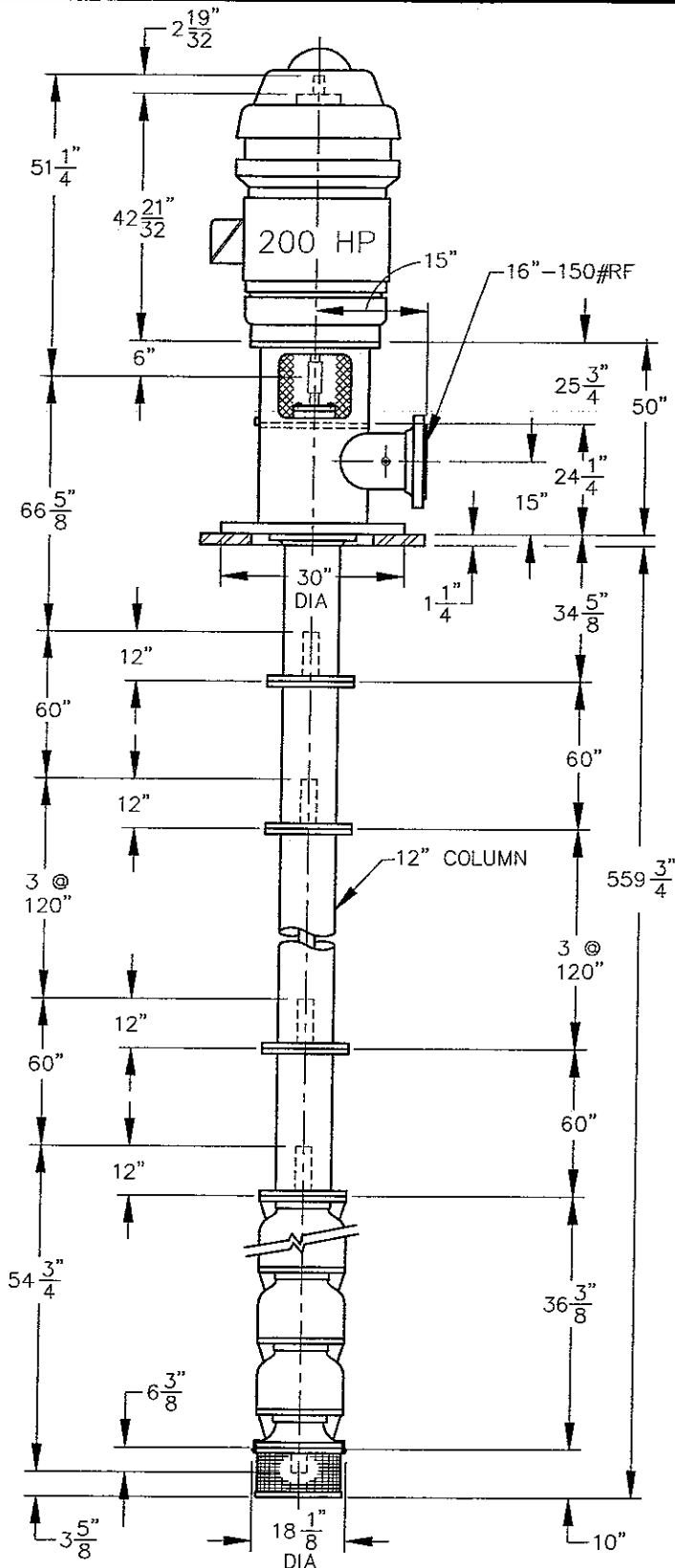
[Signature] 5-19-01
 Test Lab Date

 Quality Control Inspector Date

 Witness by Date

Req'd

"PROPERTY OF FLOWAY PUMPS
REPRODUCTION PROHIBITED WITHOUT
THE EXPRESS WRITTEN CONSENT OF
FLOWAY PUMPS."



PUMP ASSEMBLY SCHEMATIC
CW-4 PUMP 1 & 2


TYPE 16DKL STAGE 2
NO. UNITS REQ'D 2

LOCATION IOWA CITY W.T.F.

CUSTOMER KNUTSON CONSTRUCTION SVCS
2351 SOUTH SCOTT BLVD.
P.O. BOX 2058
IOWA CITY, IA 52244-2058

FLOWAY CO 38446-13
SERIAL NO. 38446-13-1/2

NO.	REVISION NOTE	BY	CHKD	DATE

 FRESNO, CALIFORNIA			
DWN. BY	DATE	APPROVED	DATE
MWA/HP	10/31/00	<i>HP</i>	11-7-00

MATERIAL
SCALE
NONE
DRAWING NO.
A 3844613SCH

PARTS LIST WITH RECOMMENDED SPARES

CUSTOMER: IOWA CITY
 WATER TREATMENT FACILITY
 CW-4 PUMP 1 & 2

SUPPLIER: KNUTSON CONSTRUCTION SERVICES
 PURCHASE ORDER NUMBER: 0143

3130 GPM-200 HP-2 STAGE 16DKL CLOSE COUPLED PUMP

TOTAL QTY - 2

SERIAL NUMBER: 38446-13-1 TO 2

DATE: 12-18-00

Qty	Part number	Description	Material	Ref #	Recom Spares
1	82705-13	'F' HEAD 16 X 20 X 30 X 50 HI	FAB STL	1/ 460	
4	100496-8084	SCREW CAP 0.625-11 x 2.750 HX HD	GR A STL	23	
4	100889-1084	NUT HX 0.625-11	GR A STL	23	
2	101465-2005	PLUG PIPE 0.250 NPT SQ HD	STEEL	13	
1	542311-2006	NAMEPLATE FLOWAY 3 1/8 X 3 1/2 X 24 GA.	S. S.	26	
1	548232-2006	NAMEPLATE GENUINE FACTORY PARTS	S. S.	26	
6	101217-3130	SCREW DRIVE TYPE U #2 x 0.250 LG	PLT STL	26	
1	545424-1129	NAMEPLATE "FLOWAY TRADEMARK"	ALUM	26	
5	101217-5130	SCREW DRIVE TYPE U #2 x 0.375 LG	PLT STL	26	
1	305432-1014	RING O 5.375 x 5.875 x 0.250	BUNA N	76	*
8	100492-4084	SCREW CAP 0.500-13 x 1.250 HX HD	GR A STL	78	
1	544723-5005	FITTING GRSE ZERK 1/8 NPT	STEEL	79	
1	544723-7007	LUBRICAP #1087K11	RUBBER	79	
1	544069-1097	SHAFT HEAD 1.500 x 51.250" LONG	416 SS	30	
1	544087-174-1	NUT,ADJUSTING-VHS-1.50-3_HOLES	B16-H02 C360	31	
1	542963-4086	KEY GIB 0.375 x 0.375 x 2.000	1020 STL	33	
1	100368-10842	SCREW MACHINE 0.250-20 x 2.000 RD HD SLT	GR A STL	32	
1	546395-1051	BOX STD STUFFING 1.500 LOW PROFILE	CL 30 CI	75	
1	541830-1039	BEARING BRONZE 1.500 x 1.875 x 3.000	932 BRZ	77	*
5	549130-1000	RING PACKING 0.375 SQ x 5.875 LG	ACRYLIC	80	*
2	542802-4090	STUD 0.375-16 x 2.500	303 SS	86	
2	100885-1106	NUT HX 0.375-16	304 SS	86	
1	549930-1017	SLINGER 1.500 x 3.500 x 0.250	NEOPRENE	99	
1	82704-8	SOLE PLATE 34 SQ X 22 ID X 1.25"	STEEL	34	
4	100502-5084	SCREW CAP 1.000-8 x 2.500 HX HD (SOLE PLATE TO HEAD)	GR A STL	35	
1	542549-5097	SHAFT LINE 1.500 x 66.625" LONG	416 SS	66	
6	542568-097	COUPLING,SHAFT-THRD-1.50	416 SS	170	
3	540011-2010	ASM WL LINE SHAFT 1.500 x 10' W/SLEEVE	ASSEMBLY	171	
2	540021-2010	ASM WL LINE SHAFT 1.500 x 5' W/SLEEVE	ASSEMBLY	172	
5	540209-1057	RETAINER BEARING 12 x 3.00 ID	GR 60 DI	180	
5	540930-1017	BEARING TYPE H 1.66 x 3.015 x 5.00	NEOPRENE	183	*
1	82705-14	COLUMN, TOP FLANGED: LESS THAN 20"	ASSY	150	
1	549673-1013	GASKET VELLUMOID 13.531 x 19 x 0.031	VELLUMD	155	*
12	100500-5084	SCREW CAP 0.875-9 x 2.250 HX HD (COLUMN TO HEAD)	GR A STL	16	
1	82699-19	COLUMN, INTER. FLANGED: 12" X 60" LONG	ASSY	151	
3	82699-20	COLUMN, INTER. FLANGED: 12" X 120" LONG	ASSY	151	
1	82705-17	COLUMN, BOTTOM FLANGED: LESS THAN 20"	ASSY	152	
60	100500-9084	SCREW CAP 0.875-9 x 3.250 HX HD (COLUMN TO COLUMN)	GR A STL	156	
60	100891-1084	NUT HX 0.875-9	GR A STL	157	
1	542122-1097	SHAFT PUMP 1.500 x 2.250 x 54.750" LONG	416 SS	200	

G:/JOBS/38000/38446/FINALDATA/3844613PL

DRWG. NO: 3844613PL REV. 1 (6-6-01)

*=RECOMMENDED SPARES

PAGE 1 OF 2

DJ

PARTS LIST WITH RECOMMENDED SPARES

CUSTOMER: IOWA CITY
 WATER TREATMENT FACILITY
 CW-4 PUMP 1 & 2

SUPPLIER: KNUTSON CONSTRUCTION SERVICES
 PURCHASE ORDER NUMBER: 0143

3130 GPM-200 HP-2 STAGE 16DKL CLOSE COUPLED PUMP

TOTAL QTY - 2

SERIAL NUMBER: 38446-13-1 TO 2

DATE: 12-18-00

1	542568-097	COUPLING, SHAFT-THRD-1.50	416 SS	170	
1	548300-1052	BOWL 16DK TOP	CL 30CIE	224	
1	548300-1052	BOWL 16DK INTER	CL 30CIE	225	
2	547593-1039	BEARING BRONZE 2.250 x 2.750 x 4.000	932 BRZ	226	*
36	100496-4084	SCREW CAP 0.625-11 x 1.750 HX HD	GR A STL	223	
2	548301-1021	IMPELLER 16DKL DYN BAL	838 BRZ	205	
2	541277-1083	COLLET IMPELLER 2.250	1215 STL	206	
1	548304-1051	BELL SUCT 16DK	CL 30 CI	214	
1	541279-1020	COLLAR SAND 2.250 x 3.000 x 1.375	838 BRZ	217	
2	100611-2090	SCREW HX SOCKT SET .250-20 x .250 CUP PT	303 SS	218	
1	542239-1039	BEARING SUCTION 2.250 X 2.750 X 10.000	932 BRZ	216	*
1	101472-3051	PLUG PIPE 2.500 NPT C'SUNK	CL 30 CI		
1	545610-4091	STRAINER CLIP 18MK-16DK	304SS	275	
3	547957-1093	CLIP BSKT STRNR 1/8 X 1 X 2-3/8	316 SS	276	
3	100484-4090	SCREW CAP 0.250-20 x 0.750 HX HD	303 SS	277	
3	101225-6144	WASHER LOCK 0.250 EXTERNAL TOOTH	410 SS	274	
1	544740-1001	NAMEPLATE PUMP BOWL	BRASS	244	
1	548233-2001	NAMEPLATE "GENUINE FACT. PARTS(BOWL)	BRASS	244	
4	101217-3130	SCREW DRIVE TYPE U #2 x 0.250 LG	PLT STL	245	